DOCUMENT RESUME

ED 332 447 EC 300 310

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TITLE The Use of Music and Its Effects on the Behavior and Academic Performance of Special Students: A Review of the Literature.
PUB DATE 84
NOTE 17p.
PUB TYPE Information Analyses (070)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Academic Achievement; Behavior Problems; *Disabilities; Elementary Secondary Education; *Music; Music Therapy; Research Needs; Social Behavior; *Student Behavior

ABSTRACT

This literature review focuses upon research addressing the playing of music and its effects upon the academic performance and behavior of students with exceptionalities. Literature on music's effects on academic performance focuses primarily on mathematics, reading, and ability to attend to study materials. Behavioral research focused on the effects of different types of music on task-related behavior, unacceptable behavior, interpersonal conflicts, motor activity rate, relaxation, and attention span. The review concludes that findings regarding the effect of music on studying, math and reading performance, activity rates, and social behavior are unclear and often contradictory. Research needs are outlined. (27 references) (JDD)

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The Use of Music and It s Effects on the Behavior and Academic Performance of Special Students: A Review of the Literature

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Abstract

A review of research studies regarding music and it's effects upon the behavior and academic performance of students with special needs revealed a lack of consensus in the findings. Suggestions for future research are given.

The Use of Music and It's Effects on the Behavior and Academic Performance of Special Students: A Review of Literature

Although it is certainly not the trend for teachers to play music during the instructional phases of their classes, it is not unusual to hear music emanating from a classroom during non-academic phases and study periods. Opinions regarding this practice vary depending upon one's viewpoint: Some perceive the music to be a distractor, while others believe that it can serve to "relax" the pupil and create a more enjoyable learning environment.

Most students do listen to music while at home working on the next days' assignments. Miller (1947) found that 50% of pupils reported studying at home with music in the background while the majority of students questioned by Leipold (1947), and Movsesian and Heyer (1973) studied with music playing. After having had music played during a study hall period, Hall (1952) found that over 83% of the students desired that the music be continued. What effect, however, does this music have upon academic performance? Are students with learning difficulties affected more positively or negatively by the presence of background music than their unimpaired peers? Do students with different handicapping conditions react differently to these rhythmic sounds? Additionally, does the presence of music in the classroom affect the social behavior of special students?

This review will focus upon research which addressed the playing of music and it's effects upon the academic performance and behavior of students with exceptionalities. Due to the vagueness and subjectiveness of the terminology, measurement techniques and procedures used by most of the researchers, the terms used in each respective investigation will be placed within quotation marks when revieved.

Music and Academic Performance

Most of the research pertaining to the effects of music on academic performance was conducted with university level students (Baugh & Baugh, 1965; Etaugh & Michal, 1975; Etaugh & Ptasnik, 1982; Fendrick, 1934; Jerison, 1959; Mikol, 1954; Wolf & Weiner, 1972) and non-handicapped public school pupils, (Freeburne and Fleischer, 1952; Mitchell, 1949; Miller, 1947; Mowsesian and Heyer, 1973; Patton, Stinard and Routh, 1983; Wolf and Weiner, 1972). Few studies have involved students with special needs.

Leipold (1947), however, reported on a study by a teacher in his school who wanted to "satisfy her curiosity" regarding the effects of music on the ability to learn., This poorly designed study examined the effects radio programming (comprised of music and newscasts) on the learning ability of junior high school algebra students. The number of students involved was not given . Based upon previous unit test scores, a control group (no radio programming during class) and an experimental group (radio played during class time) were believed by the teacher to be fairly similar in their abilities to learn. After a 3-week math unit, a test on that unit was administered. The group which was exposed to music performed less favorably. The researcher also found that bright students did not "appear" to be significantly affected by the presence of music during instruction. However, the students of "average" and "below average" ability who were exposed to music were affected negatively in comparison to their control groups. Most of the students in this study reported studying to music at home. However, the effect of this variable, if any, was not investigated.

Contrasting results were found in another study regarding mathematics. The effects of classical music upon the math performance of students (N=53) with "learning problems" were studied by Vernetti and Jacobs (1972). These students aged 7-14 years were enrolled in classes for the learning disabled. They were

asked to attempt to complete a set of 20 mathematical problems in a five minute time period. The number of correct answers were recorded. Incomplete problems were considered to be incorrect. This was done under both a music (Tchaikowsky's "Nutcracker Suite") and a non-music condition each day for eight days. The order of the conditions was randomly assigned. The results indicated no differences in the accuracy of the student's answers between the two conditions. The authors believed that this indicated that students can function in a noisy environment.

The disparity in results between the two studies could, of course, be due to the length of training, the testing limitations, the type of music, the methodology, or the lower age and different intellectual groupings of the Leipold study in comparison with the investigation of Vernetti and Jacobs. Due to the dearth of research in this area, it would be difficult to speculate as to which variables are most important to consider.

As with math, only two studies exist which investigate the effect of background music on the reading performance of pupils with below average IQ and/or achievement. Unselected eighth and ninth grade students (N=278) were studied in a research project by Hall (1952). Utilizing a music and no music condition, pupils from five study hall periods completed the vocabulary and paragraph sections of the Nelson Silent Reading Test, Forms A an B, for grades three through nine. Form A was given under the no music condition while Form B was administered under the music condition. The music program was selected in accordance with the "standards prescribed for music in industry". These standards were not reported or referenced by the author. The order in which the conditions were presented was randomly assigned. Hall also reviewed previously collected IQ information of the subjects. Results revealed that 48% of students improved accuracy of performance and increased total scores during the music conditions. However, Hall reported that students with below average IQ and/or

achievement scores improved most with the playing of background music in class. In fact, Hall believed that the music might actually assist these students in attending to task.

Fogelson (1973) also studied the effect of music upon reading performance. As in the Hall study, the effects of music on students with differing intelligence levels were investigated. The sample of eighth graders (N=28) was divided into two English classes on the basis of Stanford-Binet IQ scores (the exact criteria was not reported.) These groups were labeled by the researchers as "bright" and "non-bright" using this unstated criteria. Each group was also divided into a control (non-music) and an experimental group (music). The Iova Test of Basic Skills R, Form 4 for eighth grade was then administered to all groups while the experimental groups listened to a popular music album by Mantovani entitled Favorite Show Tunes. In contrast to the research results of Hall, Fogelson found that both experimental groups performed significantly worse than their control group counterparts, with the "non-bright" group being much more negatively affected by the background music than the "bright" group. The "non-bright" students reported being more distracted by the music.

Results which would disagree with the findings of both Hall's and Fogelson's studies emanate from two research investigations with non-disabled young adolescents (i.e. 6th to 9th grade). They do, however, provide another view of this age group. Mitchell (1949), using three unselected groups of sixth grade students (N=91) obtained silent reading scores of subjects under radio/music programming (Hour of Charm, Hit Parade), radio/variety programming (Dagwood and Blondie, Charlie McCarthy), and no radio conditions. All three forms of the Iova Silent Reading Test for grades four through nine were given to each group of subjects under each radio situation. All groups performed significantly better during the no radio condition than during the variety programming. No significant difference was found for any group between the

music and no music conditions. However, those with IQ's over 100 (N=37) performed significantly better under the music condition and were not affected in their performance by the variety programming.

Miller (1947), using two classes of sixth and seventh grade students (N=85), studied the degree to which radio-listening affected the ability to attend to study materials. All of the subjects were given one form of the reading section of the Stanford Achievement Test under a silent condition. Once each week for the next five weeks different forms of the test were administered under radio conditions. On the sixth week, another form of the test was administered during a silent condition. The results of the study showed that no significant difference was ascribable to the presence or absence of radio programming. Therefore, the above two studies with non-handicapped youth find, in general no effects on performance due to the presence of music. Again, the small number of investigations in this field make it difficult to speculate why results varied. Some variables which need to be considered are the familiarity of the music and the frequency and duration of play when studying. These have been investigated at the college level by Etaugh and Michals (1975) who found that the more undergraduates reported studying to music, the less their performance on tests of reading comprehension was impaired while music was played. These authors also found that a higher percentage of male college students reported listening to music while studying than did females. The males also scored higher on reading comprehension tests while music was playing than did the females. As an extention of this, Hilliard and Tolin (1979), studying reading comprehension among college graduates found that "performance in the presence of familiar background music is higher than in the presence of unfamiliar music" (p. 714). On the other hand, the women in the Etaugh and Michals (1975) study who reported that they seldom or never studied to music,

scored higher on the reading comprehension tests during the silent condition.

Future researchers may wish to investigate these variables with handicapped children and youth. It would appear that more research into the effects of music on academic performance is in order. This is due primarily to three reasons, the dearth in the number of studies, the flaws in methodology and design, and the apparently conflicting results between the two studies in each field reviewed.

Considering the integral part music plays in our culture, and the degree to which our children study with it, it makes sense to study the effects of it's playing on the academic performance. Hopefully, these future investigations will allow us to determine specific effects upon various populations and suggest guidelines for the playing of music when students study at home and school.

Music and Behavior

Again, as in the previous section, there is a dearth of research regarding students with special needs. To date, five studies have been conducted. Using specific definitions of behavior and categorizing music types by metronome count, Cowell (1984) improved upon former music studies which were flawed by the use of subjective terminology and a lack of adequate controls in design, procedure and methodology. In the Cowell study, three non-obtrusive observers seated behind a one-way glass documented the frequency of six behaviors over a twelve (12) week period in a study hall of a school for students labeled as being behavior disordered. Using a sequential rotation design, the observers obtained a high inter-rater reliability (92.54%). No differences were found between the three randomly assigned conditions of no music, stimulating music, and sedative music for disruptive motor, disruptive verbal, aggressive motor, aggressive verbal and non-disruptive/off-task behaviors. However, sedative symphony music was significantly more likely to promote on-task behavior than stimulating popular tunes.

Another study involving students who displayed unacceptable behavior in the classroom was conducted by Alward and Rule (1960). Observing fifth and sixth graders (N=14), the researchers collected data by means of behavior checklists, surveys, questionnaires and interviews. A therapy program which included listening to music, had been developed for use with these pupils. It was reported that music seemed to have a quieting effect on these students.

Using "mood music" Lindecker (1954) and Love (1953) also observed the effects of music on students with emotional/behavioral problems. In the Lindecker (1954) study, the pupils were described as being of four types: runaways, children needing protection, dangerous children, and children held for questioning. A public address system piped music into four living quarters and

the dining room during mealtime, work time, bedtime, and when the group was in a "disturbed" state. Staff members and children both rated the effects of music as being favorable. Love (1953) conducted a study in a juvenile detention home. He reported that if a fight or argument erupted in the study's juvenile detention home, sedative music played over the speaker calmed the situation almost immediately.

Scott (1970) investigated the effect of an ascending music stimulus program on the activity rates of 13 boys, ages 5 1/2 to 8 1/2 years of age. These students were identified as being hyperactive by teachers completing the Connor's Teacher Rating Scale (1969). An ascending music program was described as a stereophonic instrumental program with a progressive increase in tone frequency (Hz), tempo, and percussive elements. Scott hypothesized that motor activity, as rated by the Motor Activity Rating Scale (Washburn, 1936), would be greater during the last five minutes of an ascending music program tape played during art classes in a public elementary school, than before or after the playing of the tape. Contrary to expectations, the rate of activity increased through each of the three recording periods (baseline, experimental, post-experimental) rather than increasing during the experimental period and decreasing after the playing of the recording. Scott believed that students, used to hearing rock and roll music played during their art classes, were not exposed to a novel experience during the experiment. The author also suggested that the students, focused on a visual-motor task, may not have been susceptible to the effects of the programmed tape. It was further speculated that the length of the unstructured art period (40 minutes) may have been responsible for the increased activity over time due to that lack of structure. The formation of a control group, not exposed to music, would have assisted in the interpretation of results.

Eleven severely retarded, institutionalized boys, ages 6-17 years, were the focus of a study by Reardon and Bell (1970) investigating the effects of sedative and stimulative music on activity rates. The four randomly-assigned conditions were: sedative music (Bach chorales), stimulative music (rock and roll), a spoken version of "Pinocchio" (male voice with no musical background), and no music. The three sound conditions were played at approximately 80 decibels for one hour as the subjects sat in a semi-circle around the tape player. This was done four nights per week for eight weeks. Each condition was conducted one night per week. Students were observed individually in sequence for behaviors such as "sleeps", "cries", "screams", "pushes others" and "hand movements". After adding the frequencies of the active behaviors, it was found that the use of sedative music resulted in an increase in activity level greater than that of stimulating music. The authors suggested that the lower activity rates during the stimulating music were a result of the music replacing the need for activity and self stimulation.

Lastly, Schneider (1954), using ten cerebral palsied children (5 athetoid, 5 spastic) determined that the calming or exciting effect instrumental music had on "total" behavior depended upon the type of disability. In this investigation, children with spastic cerebral palsy were found to relax more when stimulative music was played. Children with athetoid cerebral palsy were found to need sedative music in order to relax. In general, music was found to increase the attention span of all of the children, although spastic children were more on task to stimulative music and athetoid children more on task to sedative music. Observation procedures used in this study lacked rigor however, and may cause the results to be suspect.

Research into the effects of music on activity rates of young children (Rieber, 1965; Simons, 1964) suggested that "Relative to a control condition of no music, sedative music should reduce activity while stimulative music should

increase it" (Reardon & Bell, 1970, p. 156). This came to be known as the "iso" principle.

Research involving exceptional students is contradictory with respect to this principle. Some research (Alvard and Rule, 1960; Lindecker, 1954; Love 1953) supports the "iso" principle, some results refute it (Reardon & Bell, 1970) and some research supports or refutes it depending upon conditions considered (Cowell, 1984; Schneider, 1954). Certainly this is an area in need of more research. This research should attempt to identify which factors are important to consider when attempting to determine the effects of music on behavior.

Discussion

At the moment there are no definite guidelines to assist educational personnel and residential staff in the use of music. Currently, findings regarding the effect of music on studying, math and reading performance, activity rates and social behavior are unclear and often contradictory. Future research efforts will need to further delineate variables which are important to consider in the use of music. In addition to the subject variables of age, sex, setting, and handicapping condition, researchers will need to determine the effect of various types of music. In the selection of this music, researchers will need to determine the effect of various types of music. In the selection of this music researchers must consider and document vocal versus instrumental, the words used in vocal selections, instruments used in the instrumental pieces, tempo, decibel level, and thematic/cultural influences. These variables should be delineated as was done in the study by Cowell (1984). Additionally, the study by Cowell and to some extent, Scott (1970) used rigorous design and methodology. Future investigations should follow these previous examples to avoid the subjective terminology and procedures which flawed most of the

research investigations in this area.

It is surprising, given the possible importance of this avenue of research, that more studies have not been undertaken. As more information does become available, teachers may be better able to decide whether to use music in their classes and under which circumstances. Residential staff will perhaps be better able to judiciously use music to mediate behavior. This is a promising area for research, but as of now there is much to be done before music can be used effectively and efficiently to promote attention to task and deter inappropriate behavior.

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